

Notice of Allowability

Application No.

09/716,892

Applicant(s)

CHANDHOKE, SUNDEEP

Examiner

Aaron C. Perez-Daple

Art Unit

2154

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to telephone conversation of 6/7/05.
2. ☒ The allowed claim(s) is/are 1,2,5,7,8,10,12-14,17,19,20,23 and 24.
3. ☒ The drawings filed on 20 November 2000 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

JOHN FOLLANSBEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jeff Hood (Reg. 35,198) on 6/7/05.

2. Claims 1, 2, 5, 7, 8, 10, 12-14, 17, 19, 20, 23 and 24 as amended below are allowed.
3. The application has been amended as follows:

1. (Currently Amended): A method for performing user controllable autotuning of a ~~PID~~ Proportional-Integral-Derivative (PID) controller, the method comprising:

- displaying at least one graphical user input (GUI) element for specifying a desired performance characteristic of a PID controller autotuning algorithm;

- receiving user input to the at least one GUI element, wherein the user input comprises a user-drawn step response curve, wherein the user-drawn step response curve ~~[[indicating]]~~ indicates the desired performance characteristic of the PID controller autotuning algorithm;

- deriving one or more parameter values indicating the desired performance characteristic of the PID controller autotuning algorithm from the user-drawn response curve;

- configuring the PID controller autotuning algorithm ~~[[in response to the user input indicating the desired performance characteristic]]~~, wherein said configuring the PID

controller autotuning algorithm comprises applying the one or more parameter values to parameters of the PID controller autotuning algorithm, wherein said configuring produces a configured PID controller autotuning algorithm; and

executing the configured PID controller autotuning algorithm to tune the PID controller;

wherein the user input indicating the desired performance characteristic indicates a desired operation of the PID controller after execution of the autotuning algorithm, and wherein the desired operation includes one or more of stiffness and response time.

2. (Previously Presented): The method of claim 1,

wherein the PID controller autotuning algorithm executes according to the desired performance characteristic indicated by the user.

3. (Cancelled).

4. (Cancelled).

5. (Previously Presented): The method of claim 1, further comprising:

displaying a graphical user interface on a display device, wherein the graphical user interface includes one or more user input controls which are operable to receive the user input indicating the desired performance characteristic of the PID controller autotuning algorithm.

6. (Cancelled).

7. (Previously Presented): The method of claim 5,

wherein the one or more user input controls comprise one or more data fields;
wherein the one or more data fields are operable to receive respective parameter values
indicating the desired performance characteristic of the PID controller autotuning
algorithm.

8. (Previously Presented): The method of claim 1,

wherein the user input comprises one or more parameter values indicating the
desired performance characteristic of the PID controller autotuning algorithm; and
wherein said configuring the PID controller autotuning algorithm comprises applying
the one or more parameter values to parameters of the PID controller autotuning
algorithm.

9. (Cancelled).

10. (Previously Presented): The method of claim 1,

wherein the user input determines a value d , wherein the value d indicates the
desired performance characteristic of the PID controller autotuning algorithm; and

wherein said configuring the PID controller autotuning algorithm comprises applying the value d to modified Ziegler-Nichols equations:

$P = 0.7 * K_{max}$, where K_{max} is a value of P at a point of instability;

$I = P / (0.5 * T)$ where T is a time corresponding to f_o , where f_o is a frequency of oscillation;

$D = (1 * d + 5) * P * 0.125 * T$ where d specifies a control characteristic; and

$T_d = 5 * d + 1$ where T_d is a derivative sample period.

11. (Cancelled).

12. (Currently Amended): A computer system for performing user controllable autotuning of a ~~PID~~ Proportional-Integral-Derivative (PID) controller, the computer system comprising:

a processor;

a memory medium coupled to the processor, wherein the memory medium stores:

a PID controller autotuning algorithm; and

a software program operable to configure the PID controller autotuning algorithm in response to user input;

a display device, coupled to the processor and the memory medium, wherein the software program is executable to display at least one graphical user interface (GUI) element for specifying a desired performance characteristic of a PID controller autotuning algorithm on the display device; and

an input device which is operable to receive user input to control the at least one GUI element, wherein the user input comprises a user-drawn step response curve [[thereby]] indicating the desired performance characteristic of the PID controller autotuning algorithm;

wherein the software program is operable to:

derive one or more parameter values indicating the desired performance characteristic of the PID controller autotuning algorithm from the user-drawn response curve; and

configure the PID controller autotuning algorithm [[in response to the user input indicating the desired performance characteristic,]] by applying the one or more parameter values to parameters of the PID controller autotuning algorithm, wherein said configuring produces a configured PID controller autotuning algorithm;

wherein the processor is operable to execute the configured PID controller autotuning algorithm to tune the PID controller; and

wherein the user input indicating the desired performance characteristic indicates a desired operation of the PID controller after execution of the autotuning algorithm, and wherein the desired operation includes one or more of stiffness and response time.

13. (Previously Presented): The computer system of claim 12, further comprising:

a display device coupled to the processor, wherein the display device is operable to display a user interface which is operable to receive the user input indicating a desired performance characteristic of a PID controller autotuning algorithm.

14. (Previously Presented): The computer system of claim 13,
wherein the user interface comprises a graphical user interface, wherein the graphical user interface includes one or more user input controls which are operable to receive the user input indicating the desired performance characteristic of the PID controller autotuning algorithm.

15. (Cancelled).

16. (Cancelled).

17. (Previously Presented): The computer system of claim 12,
wherein the PID controller autotuning algorithm is executable according to the desired performance characteristic indicated by the user.

18. (Cancelled).

19. (Currently Amended): A memory medium comprising program instructions,
wherein the program instructions are computer-executable to perform:
displaying at least one graphical user input (GUI) element for specifying a desired performance characteristic of a ~~PID~~ Proportional-Integral-Derivative (PID) controller autotuning algorithm;

receiving user input indicating the desired performance characteristic of a PID controller autotuning algorithm, wherein the user input comprises a user-drawn step response curve;

deriving one or more parameter values indicating the desired performance characteristic of the PID controller autotuning algorithm from the user-drawn response curve;

configuring the PID controller autotuning algorithm [[in response to the user input indicating the desired performance characteristic]], wherein said configuring the PID controller autotuning algorithm comprises applying the one or more parameter values to parameters of the PID controller autotuning algorithm, wherein said configuring produces a configured PID controller autotuning algorithm.

executing the configured PID controller autotuning algorithm to tune the PID controller;

wherein the user input indicating the desired performance characteristic indicates a desired operation of the PID controller after execution of the autotuning algorithm, and wherein the desired operation includes one or more of stiffness and response time.

20. (Previously Presented): The memory medium of claim 19,

wherein the PID controller autotuning algorithm executes according to the desired performance characteristic indicated by the user.

21. (Cancelled).

22. (Cancelled).

23. (Previously Presented): The memory medium of claim 19, further comprising:

displaying a graphical user interface on a display device, wherein the graphical user interface includes one or more user input controls which are operable to receive the user input indicating the desired performance characteristic of the PID controller autotuning algorithm.

24. (Previously Presented): The memory medium of claim 23,
wherein the user input comprises one or more parameter values indicating the desired performance characteristic of the PID controller autotuning algorithm; and
wherein said configuring the PID controller autotuning algorithm comprises applying the one or more parameter values to parameters of the PID controller autotuning algorithm.

25. (Cancelled).

26. (Cancelled).

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4. The following is an examiner's statement of reasons for allowance: the prior art of record does not teach or suggest receiving at a GUI element a user input comprising a user-drawn step response curve, wherein the user-drawn step response curve indicates the desired performance characteristic of the PID controller autotuning algorithm. Therefore, the present invention provides an improved system and method for performing user controllable autotuning of a PID controller.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron C. Perez-Daple whose telephone number is (571) 272-3974. The examiner can normally be reached on 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on (571) 272-3964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access

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to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 6/23/05

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